KLYACHKO, Yu. A.

129-2-7/11

AUTHORS: Ginberg, A.M., Candidate of Technical Sciences and Klyachko, Yu.A., Doctor of Chemical Sciences, Professor.

TITLE: Dependence of the Mechanical Properties of Electrically-deposited Copper on the Regime of Electrolysis and the Composition of the Electrolyte (Zavisimost' mekhanicheskikh svoystv elektroosazhdennoy medi ot rezhima elektroliza i sostava elektrolita)

PERIODICAL: Metallovedeniye i Obrabotka Metallov, 1958, No. 2, pp. 35 - 37 (USSR).

ABSTRACT: Literary data on the mechanical properties of copper obtained in sulphuric acid electrolytes are inadequate and contradictory. This is attributed to the fact that individual authors tested electrolytically deposited layers which were produced under differing electrolysis regimes in electrolytes of various compositions and differing subsequent heat treatments. In determining the mechanical properties of electrically deposited copper and elucidating the dependence of these properties on the cathode current density in the electrolyte composition, the authors of this paper carried out special tests, using as specimens hollow tubes 250 mm long, 30 mm inner diameter and with a wall thickness of 1mm. As a pattern for producing these, an aluminium tube of 30 mm outer diameter and

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Dependence of the Mechanical Properties of Electrically Deposited Copper on the Regime of Electrolysis and the Composition of the Electrolyte.

a wall thickness of 1 mm was used. The deposition of copper on the patterns was effected simultaneously in two electrolytes, one consisting of 250 g/litre of blue vitriol, 70 g/litre of sulphuric acid and an addition of 10 g/litre of ethyl alcohol, and the other one consisting of the same electrolyte but without the addition. The electrolysis in the electrolyte with ethyl alcohol was effected with a current density of 1.8, 5, 10, 15, 20 and 25 A/dm^2, whilst the current density for the electrolyte not containing ethyl alcohol addition was 1.8 and 5 A/dm^2, respectively. Under each regime, 10 specimens were produced. The specimens produced in the electrolyte without the ethyl alcohol addition, using a current density of 1.8 A/dm^2, had a strength of 12 kg/mm^2, a relative elongation of 11% and, in the case of a current density of 5 A/dm^2, the respective values were 17 kg/mm^2 and 16.2%. The dependence of the strength and the relative elongation of electrolytic copper on the current density in electrolytes with ethyl alcohol addition are graphed in Fig. 1. The Debye patterns, obtained by V.M. Rozenberg (Fig. 2), show that from a current density

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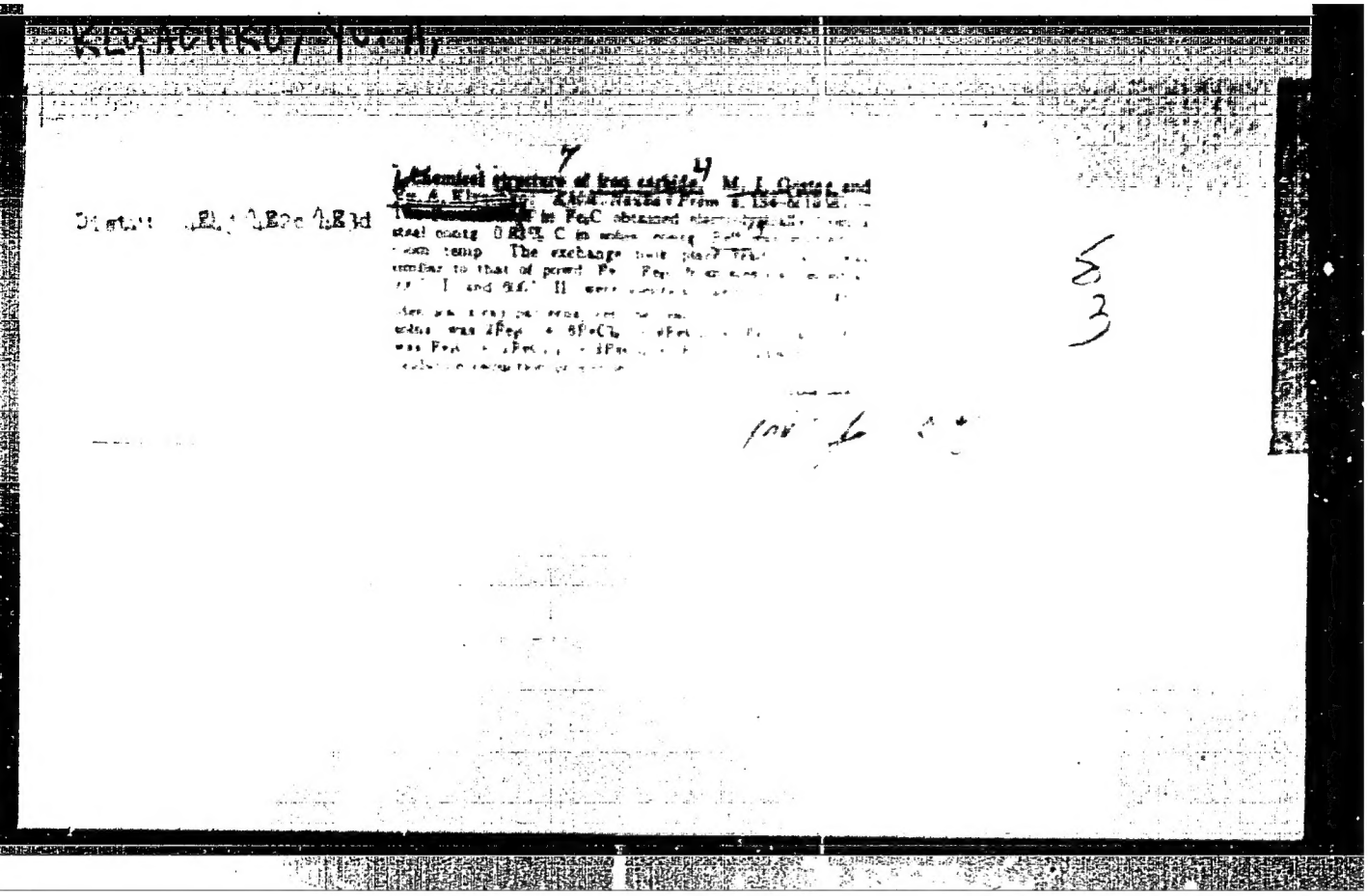
KLYACHKO, Yu.A.; IZMAILOVA, T.A.; KUNIN, L.L.

Electrochemical properties of hydrogen in iron alloys. Khim. nauka i prom. 3 no.1:127 '58. (MIRA 11:3)

1. Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii.
(Hydrogen) (Iron alloys)



5(0)
AUTHOR: Klyachko, Yu. A.

SOV/32-24-11-1/37

TITLE: Mendeleyev and Modern Science (Mendeleyev i sovremennaya nauka)

PERIODICAL: Zavodskaya Laboratoriya, 1958, Vol 24, Nr 11, pp 1299-1304 (USSR)

ABSTRACT: In December of this year the VIII. Mendeleyev Conference for General and Applied Chemistry will take place. (A notice stated that the VIII. Mendeleyev Conference would take place in March, 1959, instead of this December). The Conference comes at a time when the acceleration in production in the chemical industry (and especially for synthetic materials) determined by the May assembly of the TsK of the KPSS is taking place. D. I. Mendeleyev was a great revolutionary in chemistry, because the development of science does not come about through an "evolutionary mechanism" (Ref 1). Periodic regularities play an important part in natural science, since they express an objective dialectic of the inorganic world as well as the transformation of quantity into quality. This regularity or law serves as a starting point (among others)

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for the Pauli Principle in the investigation of the structure of the atom shell and in the study of the distribution of the elements in the earth. From periodic regularities the science of geochemistry has developed through the work of Gol'dshmidt and Fersman. In the field of analytical chemistry a systematic study of the physical-chemical properties of the groups of elements has begun, as, for example, in the work of T. Moeller (Meller) et al.(Ref 12), A. F. Kuteynikov (Ref 13), and I. P. Alimarin and Ye. S. Prabeval'skiy et al.(Ref 14). The work of K. B. Yatsimirskiy (Ref 18), Charles (Charlz) (Ref 19) and V. I. Kuznetsov (Ref 20) is consistent with the periodic system of the elements. The Mendeleyev theory of solution is adequately expressed in the "Composition-Properties" diagram, which has been further developed in the writings of N. S. Kurnakov, A. K. Babko and I. V. Tananayev. Mendeleyev strongly criticized the subjective-idealistic nature of the Ostwald energy formulation (Ref 29) despite his personal contact with Ostwald's collegues Butlerov and Vagner. In addition to his physical-chemical work D. I. Mendeleyev contributed to the development of industry in Russia, irrigation of the Volga Region, and the conquest of the stratosphere.

18(7), 5(4) SOV/32-24-11-3/37

AUTHORS: Klyachko, Yu. A., Shapiro, M. M., Mal'tseva, V. S., Mil'chev, V. A.

TITLE: Investigations Concerning the Theory of the Electrochemical Phase Analysis of Alloys (Issledovaniya po teorii elektrokhimicheskogo fazovogo analiza splavov)

PERIODICAL: Zavodskaya Laboratoriya, 1958, Vol 24, Nr 11, pp 1308-1314 (USSR)

ABSTRACT: It has been shown (Ref 1) that the basis of this analysis is the relative polarizability of the phases. Koch (Kokh) et al. (Ref 2) were later able to obtain interesting results, but only for steel. In the work reported here only nickel alloys were investigated. Already existing methods (Ref 3) which were developed by N. I. Blok et al.(Ref 4) were used in the experiments. The samples used underwent a preliminary thermal treatment (three kinds), according to the advice of G. V. Estulin. The separation of phases took place in the following ways: 1) Separation of the inter-metallic compounds from the carbides by the TsNIIChM method (Ref 3) - anodic dissolution of the sample in the electrolyte: 5% $FeSO_4.7H_2O$ + 3.5% NaCl +

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Investigations Concerning the Theory of the Electrochemical Phase Analysis of Alloys

5% H_2SO_4, using a current density of 0.025-0.05 Ampere/cm^2 over a period of 1-1.5 hours; 2) according to the method of N. I. Blok et al. (Ref 4) - 0.9% $(NH_4)_2SO_4$ + 0.9% citric acid, 0.05 Ampere/cm^2. 3) The Blok method - 1150 ml methanol + 50 ml HCl (d=1.19), 0.05 Ampere/cm^2, cooling; 4) new method - 15% NaCl + 2.5% tartaric acid, 1.0 Ampere/cm^2. The measurement of the anode potential was carried out using a LP-5 tube voltmeter. The measuring apparatus (diagram) was used jointly with a TsNIICHM-2 electrolyzer. The dissolution occurred at almost the same potential in all cases, apparently at the dissolution potential of the passivated, anodically polarized metallic primary phase. This potential varies with the concentration of the alloy elements in the solid solution. A temperature increase leads to a decrease in potential, apparently because of a depassivation. An increase in current density leads to a marked, periodic fluctuation of the potential. The use of the VIAM carbide electrolyte, which exhibits a greater electrical resistance, allowed the carbide separation to take place at a decreased current density

Investigations Concerning the Theory of the Electrochemical Phase Analysis of Alloys

(0.05 Ampere/cm^2). Especially important was the observation that with aqueous chloride electrolytes an increase in current density decreases the polarization potential. On the basis of the experimental results obtained, which are stated in seven points, detailed explanations are given and corresponding conclusions are drawn. There are 6 figures, 3 tables, and 4 references, 3 of which are Soviet.

ASSOCIATION: Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii (Central Scientific Research Institute for Ferrous Metallurgy)

5(2) SOV/32-25-4-3/71

AUTHORS: Klyachko, Yu. A., Izmanova, T. A.

TITLE: Methods of Determining Hydrogen Depending on the Chemical Composition and Structure of Steel (Metody opredeleniya vodoroda v zavisimosti ot khimicheskogo sostava i struktury stali)

PERIODICAL: Zavodskaya Laboratoriya, 1959, Vol 25, Nr 4, pp 396-398 (USSR)

ABSTRACT: The most used methods for the hydrogen determination in metals employ a heating or melting of the metal in the vacuum. To determine the application possibilities of these methods for the determination of hydrogen in steels cast samples were examined in the present case after quenching in water. The total content of H_2 in the samples was determined after the vacuum melting (VM); the content of hydrogen was then examined by heating in the vacuum (HV), and the kinetics of the hydrogen precipitation was examined for a storing of samples) under mercury at room temperature. The following statements were made: In steels with Ti, V, and Mn with a content of more than 0.5% C, a reduced hydrogen content was ascertained by the HV method (represented graphically in figures a and b) which also applies to carbon-

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aceous (more than 0.5% C) steels (Fig v) so that these types of steel can only be analyzed by the VM method. Steels containing Nb and Ni (with any content of C) as well as aluminum- and chrome-containing steels (with low content of C) give good results in the hydrogen analysis by the HV method. In alloys with martensite structure, the martensite disintegrates at the temperatures of HV and the formation of a ferrite and carbide phase can take place; this increases the mobility of the hydrogen, and results in better precipitation. For alloys with "movable" hydrogen a storing of samples under mercury is therefore recommended unless the hydrogen analysis is done immediately after the preparation of the samples. There are 4 figures and 6 references, 5 of which are Soviet.

ASSOCIATION: Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii (Central Scientific Research Institute of Iron Metallurgy)

KLYACHKO, Yu.A.

PHASE I BOOK EXPLOITATION SOV/4617

Akademiya nauk SSSR. Komissiya po analiticheskoy khimii

Analiz gazov v metallakh (Analysis of Gases in Metals) Moscow, 1960. 304 p. (Series: Its: Trudy, tom. 10) Errata slip inserted. 4,000 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Institut geokhimii i analiticheskoy khimii imeni V.I. Vernadskogo. Komissiya po analiticheskoy khimii.

Resp. Ed.: A.P. Vinogradov, Academician; Ed. of Publishing House: A.L. Bankvitser; Tech. Ed.: V.V. Bruzgul'.

PURPOSE: This book is intended for laboratory personnel concerned with gas analysis in metals.

COVERAGE: This collection of articles is based on materials of the Commission on Analytical Chemistry AS USSR on problems dealing with gas analysis in metals. The articles present data on: 1) The vacuum-fusion method, developed by European scientists and the Soviet scientists N.P. Ghizhevskiy and Yu.A. Klyachko, for the analysis of gases in steel and aluminum, and now applicable to analysis of gases in other metals. 2) The research of Z.M. Turovtseva and coworkers at

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the Institute of Geochemistry and Analytical Chemistry imeni V.I. Vernadskiy AS USSR, Moscow, making it possible to evaluate the practicability and fields of application of the different analytical methods. 3) The contributions of Yu.A. Klyachko and coworkers in their study of thermodynamic methods for the evaluation of suitable conditions for carrying out analysis. 4) The determination of gases in metals by the sulfurous method as developed by A.K. Babko. 5) The spectrum isotope method for the determination of hydrogen as developed by A.N. Zaydel' and coworkers. The authors of these articles systematize and review critically the various analytical methods, describe the apparatus used in analysis, and indicate the basic trends of research. References accompany most of the articles.

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Analysis of Gases in Metals SOV/4617

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II. METHODS OF GAS ANALYSIS IN METALS

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AVAILABLE: Library of Congress

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JA/dwm/afm
2/6/61

KLYACHKO, Yu.A. (Moskva)

Macromolecular structure of liquid metals and the interaction of macromolecules. Izv. AN SSSR. Otd. tekh. nauk. Met. i topl. no.6: 85-87 N - D '60. (MIRA13:12)
(Liquid metals) (Molecules)

KLYACHKO, Yuriy Arkad'yevich; SHAPIRO, Sof'ya Abramovna; FILIPPOVA, M.A., red.; ZAZUL'SKAYA, V.F., tekhn.red.

[Course in qualitative analysis] Kurs khimicheskogo kachestvennogo analiza. Moskva, Gos.nauchno-tekhn.izd-vo khim. lit-ry, 1960. 702 p. (MIRA 13:5)
(Chemistry, Analytical--Qualitative)

S/180/60/000/006/015/030
E201/E391

AUTHOR: Klyachko, Yu.A. (Moscow)

TITLE: Macromolecular Structure of Liquid Metals and Interactions of Macromolecules

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Metallurgiya i toplivo, 1960, No. 6, pp. 85 - 87

TEXT: The author reviews briefly the history of metal science. This review is followed by a restatement of the author's own theory of macromolecular and micelle structure of liquid and solid metals, first proposed in 1935 (Refs. 3, 4). According to this theory the size of a region in which short-range order is preserved (a macromolecule) is governed by the mean free path of electrons in a crystal lattice. This path is of the order of 10^{-10} cm at room temperature, rising to 10 cm low temperatures. The theory yields some interesting ideas on the structure of alloys of the solid solution, intermetallic compound and eutectic types (all in liquid state). Eutectics are regarded as molecular compounds with comparatively weak

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S/180/60/000/006/015/030
E201/E391

Macromolecular Structure of Liquid Metals and Interactions of Macromolecules

interactions between small macromolecules of two saturated solutions (this confirms Danilov's ideas).
There are 23 references: 16 Soviet and 7 non-Soviet.

SUBMITTED: August 26, 1960

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KLYACHKO, Yu.A.; SHAPIRO, M.M.

Determination of nonmetallic chemically bound oxygen inclusions in titanium. Trudy Kom. anal. khim. 12:117-120 '60. (MIRA 13:8)
(Titanium--Analysis) (Titanium oxide)

CHISTYAKOVA, Ye.M.; KLYACHKO, Yu.A.

Relative determination of oxygen in titanium by the content of the nontransformed α-phase at various temperatures of hardening. Trudy Kom. anal. khim. 12:121-125 '60. (MIRA 13:8)
(Titanium--Metallography) (Titanium--Oxygen content)
(Phase rule and equilibrium)

KLYACHKO, Yu.A.; CHISTYAKOVA, Ye.M.

Determining oxygen in titanium and zirconium by the vacuum smelting method. Trudy Kom. anal. khim. 12:126-131 '60. (MIRA 13:8)
(Titanium--Oxygen content) (Zirconium--Oxygen content)
(Vacuum metallurgy)

KLYACHKO, Yu.A.; CHISTYAKOVA, Ye.M.; KUNIN, L.L.

Determination of oxygen and nitrogen in molybdenum and chromium by means of vacuum smelting. Trudy Kom. anal. khim. 12:281-287 '60.
(MIRA 13:8)

(Molybdenum--Analysis) (Chromium--Analysis)
(Vacuum metallurgy)

KLYACHKO, Yu.A.; SHAPIRO, M.M.

Phase analysis of nickel-base alloys. Trudy Kom. anal. khim. 12:383-392 '60. (MIRA 13:8)

(Nickel alloys--Analysis)
(Phase rule and equilibrium)

S/081/61/000/020/028/089
B117/B147

AUTHORS: Klyachko, Yu. A., Kunin, L. L.

TITLE: Physicochemical principles of gas determination in metals by the method of vacuum melting

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 20, 1961, 104, abstract 20D30 (Sb. tr. Tsentr. n.-i. in-t chernoy metallurgii, no. 19, 1960, 94-109)

TEXT: The authors studied the factors affecting the accuracy of gas determination in metals and developed methods for further investigations on the development of efficient analysis conditions. [Abstracter's note: Complete translation.]

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S/081/61/000/020/029/089
B117/B147

AUTHORS: Klyachko, Yu. A., Kunin, L. L., Chistyakova, Ye. M.

TITLE: Effect of an empty bath on the completeness of extraction in gas analysis in metals by the method of vacuum melting

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 20, 1961, 104-105, abstract 20D31 (Sb. tr. Tsentr. n.-i. in-t chernoy metallurgii, no. 19, 1960, 123-126)

TEXT: It was found that not all processes of reduction of oxides took place with formation of carbides under conditions of vacuum melting in a graphite crucible. No carbide phase was established by phase or X-ray structural analysis in alloy reguli obtained after extraction of gases from an Cr.3 (St. 3) steel sample. In steel regulus from St. 3 with 10% Ti, both methods showed the existence of carbide and carbonitride phases. Thus, the reduction mechanism of oxides depends on the metal nature, and must be studied individually for each case. It was also shown that there was a large quantity of suspended graphite particles, "graphite foam", in the upper part of a bar kept at higher temperature (~2000°C).

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Effect of an empty bath on ...

S/081/61/000/020/029/089
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This "foam" thickens the upper part of the Fe bath, thus impeding the removal of gas bubbles escaping from the metal. Since it is possible that the gas is not removed completely due to the thickening of the bath during long thermal retardation, it is convenient to use the metal of the bath with the lowest gas content in order to shorten the degasification process. The amount of poorly melting metal samples to be filled in must be limited by the total duration of extraction $\leq$ 1.5 hr at $\leq$ 1750°C.
[Abstracter's note: Complete translation.]

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S/081/61/000/020/033/089
B117/B147

AUTHORS: Klyachko, Yu. A., Kunin, L. L., Chistyakova, Ye. M.

TITLE: Precise formulation of the method of determining nitrogen in steel by the method of vacuum melting

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 20, 1961, 120, abstract 20D119 (Sb. tr. Tsentr. n.-i. in-t chernoy metallurgii, no. 19, 1960, 127-131)

TEXT: The authors studied the possibility of determining N_2 in steel on the basis of thermal dissociation of nitrides. Under conditions of vacuum melting, the direct decomposition of nitrides is accompanied by other processes promoting the separation of N_2, e.g., dissolution of a nitride-forming metal in the Fe bath, and formation of carbide. The authors calculated values of the dissociation pressure of nitrides for some metals taking account of the three dissociation mechanisms mentioned. They found that Mo, Si, and V nitrides may be easily decomposed in vacuum at 1500°C. Al, Zr, U, Ti, and Th nitrides do practically not dissociate in vacuum at $<$ 1727°C. With the use of an Fe bath, the elasticity of

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KLYACHKO, Yu.A.; LABUT'YEV, Yu.D.; MIL'CHEV, V.A.

Potentiostat for electrochemical analysis. Zav.lab. 26 no.2: 217-219 '60. (MIRA 13:5)

1. Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii.

(Electrochemical analysis)

S/032/60/026/009/001/018
B015/B058

AUTHORS: Klyachko, Yu. A., Larina, O. D.

TITLE: New Method of Determining Gases in Metals

PERIODICAL: Zavodskaya laboratoriya, 1960, Vol. 26, No. 9, pp. 1047 - 1051

TEXT: A new method of determining gases in metals, based on anodic dissolution of the sample is described along with the apparatus designed for this purpose. After a short discussion, it is stated that the gases in question (hydrogen, oxygen, and nitrogen) may be determined by the method described. The apparatus shown in a graph (Fig.) consists of two parts: the electrolyzer and the analyzer. Great importance was attached to a careful isolation of the anode space from the cathode space so that the hydrogen developed at the cathode may not reach the anode gas and cause measurement errors. The method was elaborated on three types of metal: stainless steel OX18H9T (OKh18N9T) (0.06% C, 0.41% Si, 1.15% Mn, 0.016% S, 0.030% P, 17.64% Cr, 10.50% Ni, 0.41% Ti), steel of the type O2Kn (O2kp) (0.12% C, 0.52% Mn, 0.046% S, 0.036% P), and Armco iron

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(0.03% C, 0.017% Mn, 0.024% S, 0.01% P, 0.2% Cu, 0.14% Ni, 0.02% Cr, traces of Si). An electrolyte (150 g/l NaCl and 25 g/l Rochelle salt) was used at a current density of 0.6 a/cm^2, and electrolysis was carried out with the potential, temperature and pH being controlled (Table 1). Mass spectrometric analyses using D_2O, made by S. N. Fedorov, showed that the gas separation took place from the metal and not from the electrolyte. Analytical results obtained by the method described as well as by the vacuum melting method (Tables 2,3) show that the hydrogen contained in the crystal lattice of the metal as well as the adsorbed one, may be determined by anodic dissolution. The latter is determined by repeated anodic dissolution, with an "uncovering" of the inner metal faces, and, according to D. P. Smith (Ref. 5), an "uncovering of the structure" taking place, which is confirmed by vacuum melting data. Data on nitrogen determination in Armco iron lead to the assumption that in this case nitrogen is dissolved in iron in "mobile" form, much like hydrogen. There are 3 tables and 6 references: 3 Soviet, 1 US. and 2 German.

S/032/60/026/011/007/035
B015/B066

AUTHORS: Klyachko, Yu. A., Shapiro, M. M., and Yakovleva, Ye. F.

TITLE: Phase Analysis of Nitrided Low-carbon Steels Which Also Contain Niobium

PERIODICAL: Zavodskaya laboratoriya, 1960, Vol. 26, No. 11, pp. 1219-1223

TEXT: The problem of niobium distribution among the phases in nitrided steels is complicated, and publications contain contradictory data (Ref. 1) regarding the phases in the binary systems Nb - C and Nb - N. Brauer and Lessor (Ref. 2) found that in the system Nb - NbC - NbN the NbC has a cubic lattice of the NaCl type. The present authors investigated the composition of the phase components of niobium in steel alloys with low carbon content, but of three different composition, i.e. the steel types 9Ж 694 (EI694), 9Ж 847 (EI847), and 9Ж 851 (EI851). They used two methods of anodic dissolution: once in an electrolyte of the TsNIIChM (15% NaCl, 2.5% tartaric acid) at a current density of 1.2 a/cm^2 and a temperature not exceeding 20°C, and, in parallel, with the same

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S/032/60/026/012/001/036
B020/B056

5.5200 1273, 1282, 1153

AUTHORS: Klyachko, Yu. A. and Chistyakova, Ye. M.

TITLE: A Thermodynamic Method of Determining the Conditions of the Analysis of Gases in Metals and Its Application for Working Out Analysis Methods

PERIODICAL: Zavodskaya laboratoriya, 1960, Vol. 26, No. 12, pp. 1335-1338

TEXT: The comparative determination of the extraction temperature of gases from various metals (Refs. 1-3) may be carried out by means of thermodynamic methods, the quantities P_{CO} and P_{N_2} being calculated from the equation $\log P = -\Delta F/4.575T$, where ΔF denotes the change in the free energy, viz., in the process

$$1/y\langle Me_xO_y\rangle + \langle C\rangle = (x/y)\{Me\} + (CO),$$

where this change is determined as the difference

$$\Delta F_1 - (1/y)\Delta F_2.$$

ΔF_1 denotes the change in the free energy of the reaction

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A Thermodynamic Method of Determining the Conditions of the Analysis of Gases in Metals and Its Application for Working Out Analysis Methods

S/032/60/026/012/001/056
B020/B056

$\langle C \rangle + (1/2)(O_2) = (CO)$ and ΔF_2 the change in the free energy of the reaction $x\langle Me \rangle + (y/2)(O_2) = \langle Me_xO_y \rangle$. Metals with high affinity to carbon are able to form carbides, and thus to facilitate the reduction of the oxide or the dissociation of the nitride. For noncarbide-forming metals, the use of a bath may be of importance in the analysis for facilitating extraction. In this case

$$\Delta F = \Delta F_{CO} - (1/y)\Delta F_{Me_xO_y} + (x/y)\Delta F_{sol.}$$ holds for the extraction in the bath. The thermodynamic calculations carried out by the authors show that the carbide formation favors the determination of oxygen and nitrogen in Ti-, Zr-, Th-, and V-containing alloys; liberating the gases from Mo-, Si-, and Al-containing alloys is facilitated by alloying the metal investigated with iron. Analysis conditions must be chosen by taking account of the characteristics of the metals concerned. The authors determined the molar heats of mixing of various metals from the phase diagrams. After calculating the reaction energy as well as the entropy of a solution of a given concentration, an equation may be set up for the chemical potential of the liquid and the solid phase at the same tempera-

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A Thermodynamic Method of Determining th... Conditions of the Analysis of Gases in Metals and Its Application for Working out Analysis Methods

S/032/60/026/012/001/036
B020/B056

ture. The condition for equilibrium is the equality of the chemical potentials. In this connection, a relation between the temperature ($T^{\circ}K$) and the concentration of the component B in the liquid and in the solid phase is set up, which permits determining the heat of mixing from the phase diagram of binary alloys. As the heats of solution and mixing are calculated by means of a simplified approximation, also the thermodynamic constants obtained may differ from the experimental values. Moreover, the phase diagrams obtained by different authors very often differ from one another. For the analysis of gases in metals by the method of the vacuum melt, the amount and the sign of the energy and heat of mixing must be known. For analyzing the gases, it is assumed that at negative values of the heat of mixing H_M (activity coefficient < 1), the partial pressure of the volatile component decreases more than in the case of an ideal solution, which obeys the Raoult law. By using specially selected baths, the quantity of the adsorption-active sublimate may be reduced, and the analytical results may be precisely formulated. The method suggested was used to work out a method of gas analysis in metallic manganese. The tank was produced from iron, copper, and nickel. There are 3 figures, 2 tables,

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A Thermodynamic Method of Determining the Conditions of the Analysis of Gases in Metals and Its Application for Working out Analysis Methods

87703
S/032/60/026/012/001/036
B020/B056

and 8 references: 7 Soviet and 1 US.

ASSOCIATION: Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii im. I. P. Bardina (Central Scientific Research Institute of Ferrous Metallurgy imeni I. P. Bardin)

Card 4/4

KLYACHKO, Yu.A.; SHAPIRO, M.M.; YAKOVLEVA, Ye.F.

Phase analysis of nitrides in steel and alloys. Biul. Inst. metaloker. i spets. splav. AN URSR no.6:59-63 '61. (MIRA 15:2)

1. Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii imeni I.P.Bardina.

(Nitrides)

S/133/61/000/007/003/017
A054/A129

AUTHORS: Klyachko, Yu. A., Larina, O. D.

TITLE: Physical forms of hydrogen in steel

PERIODICAL: Stal', no. 7, 1961, 604 - 607

TEXT: There are no reliable methods to determine the various physical forms in which hydrogen occurs in metal, although these forms have a considerable effect on various properties of the metal. A combined method for the determination of the different hydrogen forms is suggested; it consists of vacuum melting, vacuum heating and electrochemical analysis. Stainless OX18N9T (OKh18N9T) sheet steel, K2KP (K2kp) steel rods and armco iron rolled sections were tested for this purpose. Vacuum melting was carried out with the VPP-2 (VPP-2) equipment of the TsNIICHM at 1,600 and 1,800°C; in vacuum heating the equipment of the TsNIICHM was also applied; it is suitable for the determination of hydrogen and water vapors separately. The tests showed the occurrence of hydrogen in the following forms: 1) Adsorbed hydrogen. When in this form, hydrogen can best be determined by the electrochemical method. Hydrogen is present in the crystal lattice of the metal matrix which is destroyed in the anodic solution of the metal. 2) Molecular hydrogen.

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Physical forms of hydrogen in steel

This type of hydrogen can also be determined with the electrochemical method. It can be found in the micropores of the metal and in adsorbed condition on the inner surfaces. 3) Oxidized hydrogen. As proved by vacuum melting, hydrogen bonded with oxygen or with hydroxyl groups occurs mainly in steels in which hydrogen is not easily adsorbed and which solidify under oxidising conditions and which are very porous. 4) Hydrogen in hydrocarbides. Hydrogen is adsorbed in the carbide phase of the metal; when the carbide phase disintegrates, the hydrogen content suddenly drops. The above four forms of hydrogen were not found in all the steels tested. In stainless OKh18N9T steel there was hydrogen in adsorbed and molecular form and in the carbide phase. The amount of adsorbed hydrogen in this stainless steel was about 40% of the total hydrogen content. The anodic deposit of this steel which consists mainly of titanium and chrome carbides also contained a considerable amount of hydrogen. In K2kp rimming steel there is hydrogen bonded with oxygen or hydroxyl groups. All test methods revealed about equal amounts of oxidized hydrogen which in this steel evidently originate from the water-vapors adsorbed. In armco iron there was mostly adsorbed and oxidized hydrogen. By determining the hydrogen content in various steels and the form in which it occurs it will be possible to study more thoroughly the effect of hydrogen on the physical and technological properties of steel. There are 4 tables and 13 references:

Card 2/3

Physical forms of hydrogen in steel

S/133/61/000/007/003/017
A054/A129

11 Soviet-bloc, 2 non-Soviet-bloc.

ASSOCIATION: TsNIICHM

Card 3/3

KLIACHKO, Yu.A., prof.

"D.I.Mendeleev's periodic law and periodic table of chemical elements in the works of Russian scientists. An attempt at systematizing the bibliography of works published in the Russian literature from 1869 to 1957" by V.I.Semishin. Reviewed by IU.A.Kliachko. Zhur. VKHO 6 no.1:100-101 '61. (MIRA 14:3)

(Bibliography--Periodic law)
(Semishin, V.I.)

KLYACHKO, YU.A.

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PHASE I BOOK EXPLOITATION SOV/5994

Akademiya nauk Ukrainskoy SSR. Institut metallokeramiki i spetsial'nykh splavov. Seminar po zharostoykim materialam.
Kiyev, 1960.

Trudy Seminara po zharostoykim materialam, 19-21 aprelya 1960 g. Byulleten' no. 6: Khimicheskiye svoystva i metody analiza tugoplavkikh soyedineniy (Transactions of the Seminar on Heat-Resistant Materials of the Insitute of Powder Metallurgy and Special Alloys of the Academy of Sciences of the Ukrainian SSR. Held 19-21 April, 1960. Bulletin no. 6: Chemical Properties and Methods of Refractory Compound Analysis). Kiyev, Izd-vo AN UkrSSR, 1961. 124 p. 1500 copies printed.

Sponsoring Agency: Akademiya nauk Ukrainskoy SSR. Institut metallokeramiki i spetsial'nykh splavov.

Editorial Board: I. N. Frantsevich; G. V. Samsonov, Resp. Ed.; I. M. Fedorchenko, V. N. Yeremenko, V. V. Grigor'yeva, and T. M. Nazarchuk; Tech. Ed.: A. A. Matveychuk.

Card 1/5

Transactions of the Seminar (Cont.) SOV/5994

PURPOSE: This collection of articles is intended for chemists, engineers, workers at scientific research institutes and plant laboratories, senior students, and aspirants at chemical and metallurgical schools of higher education.

COVERAGE: Articles of the collection present the results of studies of the chemical properties of refractory compounds (carbides, borides, nitrides, phosphorides, silicides), refractory and rare metals, and their alloys, and some original methods of analyzing these materials, which are now being utilized in the new fields of engineering. No personalities are mentioned. Each article is accompanied by references, mostly Soviet.

TABLE OF CONTENTS:

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Card 3/5

S/032/61/027/002/001/026
B134/B206

AUTHORS: Klyachko, Yu. A. and Chistyakova, Ye. M.

TITLE: Estimation of the completeness of extraction in the determination of gases in metals by the vacuum melting method

PERIODICAL: Zavodskaya laboratoriya, v. 27, no. 2, 1961, 135-138

TEXT: To determine the effect of the melting-pot metal on the gas separation during gas extraction by the vacuum melting method, the gas separation from various metals in different melting pots was automatically recorded. The pressure of the separated gas was recorded with an electronic ЭПП-09 (EPP-09) potentiometer at constant high vacuum and constant rate of suction. From the course of the kinetic curves of the extraction process, the course of the reduction of oxides and the decomposition of nitrides can be ascertained, and possible secondary reactions can be determined. The latter must be avoided for conducting an exact analysis. The tin pot recommended for exact hydrogen determination, a nickel pot, and an iron-molybdenum pot were tested; У 12 (U 12) and Ст.3 (St. 3) steels, as well as metallic manganese, were molten for this purpose. The best analytical results were

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obtained with the nickel pot; unstable gas separation was established for the iron-molybdenum pot as well as for the tin pot. The latter, however, produced the most stable hydrogen results, while the most accurate analytical results with respect to oxygen and nitrogen were obtained in the nickel pot. Satisfactory results were obtained in the nickel and also the tin pot for the analysis of St. 3 steel, since in this steel, with a higher gas content, slight losses of carbon monoxide and hydrogen do not greatly impair the analytical results. The gas separation from metallic manganese can be determined more accurately in copper pots than in iron pots, since work is carried out in the former at a lower temperature (1100°C) than in the latter (1500-1550°C), and the manganese sublimation can be reduced. The application of the method described is recommended for other gas determinations in various metals and alloys. There are 3 figures and 3 tables.

ASSOCIATION: Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii im. I. P. Bardina
(Central Scientific Research Institute of Ferrous Metallurgy imeni I. P. Bardin)

KLYACHKO, Yu.A.; MAL'TSEVA, V.S.

Quantitative determination of the sigma-phase in stainless steel.
Zav.lab. 27 no.10:1182-1185 '61. (MIRA 14:10)

1. TSentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii im. I. P. Bardina.
(Steel, Stainless)

KLYACHKO, Yu.A.

Intellectual titan of the 18th century. Zav. lab. 27 no. 12:1445-1446 '61. (MIRA 15:1)

(Lomonosov, Mikhail Vasil'evich, 1711-1765)

KLYACHKO, Yu.A.

Concerning S.M. Beloglazov's article. Zav. lab. 27 no. 12:1469 '61. (MIRA 14:5)

(Steel—Hydrogen content)

S/700/61/000/006/010/018
D267/D304

AUTHORS: Klyachko, Yu. A., Shapiro, M. M. and Yakovleva, Ye. P.

TITLE: Separation of phase components from the nickel-base alloys and modern methods of their chemical analysis

SOURCE: Akademiya nauk Ukrainskoy SSR. Institut metallokeramiki i spetsial'nykh splavov. Seminar po zharostoykim materialam. Kiyev, 1960. Trudy no. 6: Khimicheskiye svoystva i metody analiza tugoplavkikh soyedineniy. Kiyev, Izdvo AS UkrSSR, 1961, 80-87

TEXT: The authors investigated by the method of phase analysis the multi-component refractory nickel-base alloys. The electrolytic separation of intermetallic compounds and carbides in Ni alloys containing Al, Ti, Mo, W, Nb and Co was carried out by methods developed at TsNIIChM(I) and at VIAM (II). Flowsheets of the two procedures are given and described. It was found that the differences between the quantities of electrolytic deposits, obtained with me-

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S/700/61/000/006/010/018
D267/D304

Separation of phase ...

tice (a = 5.11 kX, c = 8.31 kX, c/a = 1.63). These phases contained MeC and $Me_{23}C_6$ (only one multi-component alloy disclosed a carbide of the Me_6C type). It was shown that some carbides can be completely separated. The authors used colorimetric methods to determine Al, Nb, Ti, Mo, Co etc. It was possible to obtain reproducible and stable results in analyzing intermetallic compounds, nitrides and non-metallic inclusions. For Al content range 0.00[illegible] - 0.01% the accuracy of the method was ± 0.0001 - 0.003%. For Nb the absolute accuracy of the method was ± 0.01 - 0.1%, ± 0.0035 - 0.02% for Ti in the range 0.05 - 2% and ± 0.0001% for Co. Experimental details are given. There are 4 figures, 2 tables and 6 Soviet-bloc references.

ASSOCIATION: Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii im. I. P. Bardina (Central Scientific Research Institute of Ferrous Metallurgy im. I. P. Bardin)

S/137/62/000/008/063/065
A006/A101

AUTHORS: Klyachko, Yu. A., Shapiro, M. M., Yakovleva, Ye. F.

TITLE: Separation of phase constituents out of nickel base alloys and modern methods of their chemical analysis

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 8, 1962, 12 - 13, abstract 8K72 ("Byul. In-t metallokeram. i spets. splavov, AN UkrSSR", 1961, no. 6, 80 - 87)

TEXT: The separation of intermetallides and carbides in Ni-alloys, alloyed with Al, Ti, Mo, W, Nb and Co is carried out with the aid of the electrolytic methods. The magnitude of the potential which is established during dissolving, is of a decisive importance during the separation-out of the phases. Intermetallide phases of the following composition were singled out: Ni_3Al, $Ni_3(Ti,Al)$, Ni_3Ti; they are associated with almost all the carbides: MeC, $Me_{23}C_6$ on $Cr_{23}C_6$ base. The chemical analysis of the singled out phase constituents of the Ni-alloy for the content of Al, Nb, Ti, Mo, Co and other elements, was performed by the photocolorimetric method. The photocolorimetric determination of Al is

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S/137/62/000/008/050/065
A006/A101

AUTHORS: Klyachko, Yu. A., Shapiro, M. M., Yakovleva, Ye. P.

TITLE: Phase analysis of nitrides in steel and alloys

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 8, 1962, 113, abstract 8I763 ("Byul. In-t metallokeram. i spets. splavov AN UkrSSR", 1961, no. 6, 59 - 63)

TEXT: To carry out phase analyses of nitrides and carbonitrides of steel, the method of electrolytical dissolving is used with subsequent determination of N by the Kjeldahl method. Electrolysis of Ti-containing steels is performed in an electrolyte of 15% NaCl + 2.5% tartaric acid at 0.6 - 0.7 amp/cm^2 current density. The electrolytic deposit is dissolved in a $H_2SO_4 + KHSO_4 + K_2Cr_2O_7$ mixture and N_2 is sublimated in the form of NH_3. If carbonitrides are absent, TiN is dissolved in aqua regia and Ni_2 is determined from Ti. Al-nitrides are separated out by the chloride method. After disintegrating of the carbides by the nitric-acid method, AlN is dissolved by heating in 5% NaOH and Al is determined from the filtrate. The separation of Nb nitrocarbide is performed in the same electrolyte at 1.2 amp/cm^2 current density. After washing, evaporation and roasting,

Card 1/2

KLYACHKO, Yu.A.; MAL'TSEVA, V.S.

Investigation in the theory of electrochemical analysis of metals. Separation of austenite and martensite. Zav.lab. 28 no.5:523-528 '62. (MIRA 15:6)

1. TSentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii imeni I.P.Bardina.
(Steel—Analysis) (Electrochemistry)

S/081/62/000/019/013/053
B144/B180

AUTHORS: Klyachko, Yu. A., Shapiro, M. M., Yakovleva, Ye. F.

TITLE: Separation of phase components from nickel-base alloys and modern methods for their chemical analysis

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 19, 1962, 120, abstract 19D105 (Byul. In-t metallokeram. i spets. splavov AN USSR, no. 6, 1961, 89 - 97)

TEXT: The intermetallic and carbide phases in Ni alloys containing Al, Ti, Mo, W, Nb, and Co are separated electrochemically. The elements above are determined photometrically in the resulting mixture of carbides and intermetallic compounds: Al with Aluminon after reducing Fe^{3+} by ascorbinic acid (Al is separated from large quantities of Ti, Cr, V, Nb, and other components by precipitating as cryolite from weak sulfate solutions); Nb with arsenazo or by photometering K hexaniobate solutions at 234.5 mμ; Ti by the peroxide method without separating the accompanying components; Mo by the rhodanide method after reducing Mo^{6+} to Mo^{5+} by thiourea in the presence of $CuSO_4$; and Co with nitroso R-salt (the disturbing effect of Ni^{2+} and Fe^{2+}

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S/081/62/000/019/013/053
B144/B100

Separation of phase components ...

is eliminated by decomposing the relevant complexes by boiling with HNO_3).
[Abstracter's note: Complete translation.]

Card 2/2

KLYACHKO, Yu.A.; CHISTYAKOVA, Ye.M.

Sorption capacity of metal sublimates formed during the determination of gases in metals by the method of vacuum melting. Sbor. trud. TSNIICHM no.24:26-29 '62. (MIRA 15:6)
(Gases in metals) (Absorption) (Vacuum metallurgy)

KLYACHKO, Yu.A.; SHAPIRO, M.M.; YAKOVLEVA, Ye.F.

Analysis of nonmetallic inclusions in stainless steel. Sbor. trud. TSNIICHM no.24:64-74 '62. (MIRA 15:6)
(Steel, Stainless--Inclusions)
(Nonmetallic materials--Analysis)

KLYACHKO, Yu.A.; SHAPIRO, M.M.; YAKOVLEVA, Ye.F.

Analysis of nonmetallic inclusions in carbon steel. Sbor. trud. TSNIICHM no.24:75-81 '62. (MIRA 15:6)
(Steel--Inclusions)
(Nonmetallic materials--Analysis)

KLYACHKO, Yu.A.; IZMANOVA, T.A.; BUYANOV, N.V.; TULEPOVA, I.V.; SUKHOVA, N.P.

Spectrochemical method of analyzing nonmetallic inclusions in steel. Sbor. trud. TSNIICHM no.24:82-86 '62. (MIRA 15:6)
(Steel--Inclusions) (Nonmetallic materials--Spectra)

KLYACHKO, Yu.A.; LARINA, O.D.

Electrochemical method of determining hydrogen in steel. Sbor. trud. TSNIICHM no.24:5-13 '62. (MIRA 15:6)
(Steel—Hydrogen content) (Electrochemistry)

KLYACHKO, Yu.A.; YAKOVLEVA, Ye.F.

Electrolytic isolation and chemical analysis of iron tungstide and niobide in iron-base alloys. Sbor. trud. TSNIICHM no.24: 30-38 '62. (MIRA 15:6)
(Iron alloys—Analysis) (Intermetallic compounds—Analysis)

KLYACHKO, Yu.A.; KUNIN, L.L.; CHISTYAKOVA, Ye.M.

Determination of hydrogen in aluminum. Sbor. trud. TSNIICHM no.24:42-44 '62. (MIRA 15:6)
(Aluminum—Hydrogen content)

KLYACHKO, Yu.A.; SHAPIRO, M.M.; YAKOVLEVA, Ye.F.

Phase analysis of chromium steels alloyed with tungsten, molybdenum, vanadium, and niobium. Sbor. trud. TSNIICHM no.24:45-51 '62.
(MIRA 15:6)

(Chromium steel—Analysis)

L 14415-63 EWP(q)/EWT(m)/BDS AFFTC/ASD JD/HM/JG

ACCESSION NR: AP3004562 S/0032/63/029/008/0923/0924

AUTHOR: Klyachko, Yu. A.; Ivanova, T. A.; Chistyakova, Ye. M. 63 62

TITLE: Gas determination in sheet molybdenum 15 15 21

SOURCE: Zavodskaya laboratoriya, v. 29, no. 8, 1963, 923-924

TOPIC TAGS: molybdenum, sheet molybdenum, gas determination, oxygen, hydrogen, nitrogen, carbon monoxide, vacuum-melting method, hydrocarbon

ABSTRACT: Because poorly reproducible results are encountered in gas determination in sheet molybdenum 2—3 mm thick, an analytical method has been developed for determining oxygen, hydrogen, nitrogen, and carbon monoxide in such molybdenum by the vacuum-melting method. About 30% iron or nickel is alloyed with the molybdenum sample to lower its melting point to 1650C. To drive off moisture and adsorbed gases, the sample is preheated at 200—250C for 15—20 min in a special quartz extension of the vacuum furnace. Without contact with the air the sample is then immediately analyzed at 1700C by the vacuum-melting method. The preheating at 250C prevents hydrocarbon formation by the reaction of water vapor with molybdenum carbide and thus improves the reproducibility of results. Orig. art. has: 2 tables and 1 figure.

Card 1/2 ASSOCIATION: Central Scientific Research Inst. of Ferrous Metallurgy

KLYACHKO, Yu.A.; CHISTYAKOVA, Ye.M.; LABUT'YEV, Yu.D.

Vacuum chromatography for the determination of gases in metals.
Sbor. trud. TSNIICHM no.31:87-88 '63. (MIRA 16:7)
(Gases in metals--Analysis) (Chromatographic analysis)

KLYACHKO, Yu.A.; CHISTYAKOVA, Ye.M.

Determination of gases in chromium. Sbor. trud. TSNIICHM no.31: 114-116 '63. (MIRA 16:7)
(Chromium--Analysis) (Gases in metals--Analysis)

KLYACHKO, Yu.A.; YAKOVLEVA, Ye.F.

Differentiated phase analysis of iron and nickel-base alloys.
Sbor. trud. TSNIICHM no.31:135-143 '63. (MIRA 16:7)
(Alloys--Metallography) (Phase rule and equilibrium)
(Electrochemical analysis)

KLYACHKO, Yu.A.; IZMANOVA, T.A.; CHISTYAKOVA, Ye.M.

Determination of gases in molybdenum sheet. Zav.lab. 29 no.8: 923-924 '63. (MIRA 16:9)

1. TSentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii imeni I.P.Bardina.
(Gases--Analysis) (Molybdenum--Analysis)

KLYACHKO, Yu.A.; IZMANOVA, T.A.; CHISTYAKOVA, Ye.M.

Determination of gases in tungsten. Sbor. trud. TSNIICHM no.31: 133-134 '63. (MIRA 16:7)
(Tungsten--Analysis) (Gases in metals--Analysis)

ACCESSION NR: AP4005078 S/0032/63/029/012/1425/1427

AUTHOR: Klyachko, Yu. A.; Izmanova, T. A.; Chistyakova, Ye. M.

TITLE: Determination of the oxygen, hydrogen, and nitrogen contents in tungsten, niobium, and tantalum

SOURCE: Zavodskaya laboratoriya, v. 29, no. 12, 1963, 1425-1427

TOPIC TAGS: tungsten, niobium, tantalum, oxygen determination, vacuum melting, tantalum carbides, tungsten carbides, niobium carbides, nitrogen determination, hydrogen determination, vacuum fusion method

ABSTRACT: Because the conventional vacuum-fusion method with iron fluxing bath for determining oxygen, hydrogen, and nitrogen in metals is not reliable in the case of tungsten, niobium, tantalum, and their carbides, a new procedure, applicable to these metals, was developed. For tungsten, tantalum, and niobium, the iron fluxing bath is replaced by cobalt, nickel, and nickel, respectively. The use of cobalt and nickel as fluxing metals provides higher fluidity of the melts and quantitative evolution of the gases to be determined. The concentration of the analyzed metals in the melts should not exceed 30%. The

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ACCESSION NR: AP4005078

fluxing baths are degassed at 1900C for 10—15 min, and liberation of the gases is carried out at 1750—1800C. With the nickel fluxing bath, oxygen is determined with a relative error of 2% in niobium and 5% in tantalum. The procedure is also applicable for the determination of the gases in the carbides of these metals. Orig. art. has: 4 tables.

ASSOCIATION: Tsentral'ny*y nauchno-issledovatel'skiy institut chernoy metallurgii (Central Scientific Research Institute of Ferrous Metallurgy)

SUBMITTED: 00 DATE ACQ: 19Dec63 ENCL: 00

SUB CODE: CH NO REF SOV: 002 OTHER: 001

Card 2/2

L 19761-65 EWT(m)/EWA(d)/T/EWP(t)/EWP(b) MJW/JD/MLK

ACCESSION NR: AT4048341 S/0000/64/000/000/0036/0038

AUTHOR: Kiyachko, Yu. A.; Tulepova, I. V. B+1

TITLE: The effect of vacuuming and electroslag remelting on the content of gas and non-metallic inclusions in steel 18 18

SOURCE: AN SSSR. Komissiya po tekhnologii mashinostroyeniya. Gazy* v litom metalle (Gases in cast metals). Moscow, Izd-vo Nauka, 1964, 36-38

TOPIC TAGS: cast steel, gas saturation, degasification, steel bearing strength, steel vacuuming, electroslag remelting, steel porosity, steel inclusion / steel ShKh15 18

ABSTRACT: The authors studied the content of gases and non-metallic inclusions in steel type ShKh15, smelted in accordance with the conventional technological processes and also by remelting methods: electroslag, double electroslag, vacuum-arc and electroslag with subsequent vacuum-arc remelting. 18 The purpose of the work was to check the degree of contamination of the metal by gases and non-metallic inclusions in all the different types of melts. The basic ShKh15 steel was smelted in an open electric furnace at the Dneprospetsstal' works. For electroslag remelting, the ingot of the base metal was rolled to a diameter of 170 mm. The resultant rod was remelted in an electroslag installation to a crystallization

Card 1/3

L 19741-65
ACCESSION NR: AT4048341

agent 300 mm in diameter and 1650 mm in height. In the remelting, ANF-6 flux was used, having the following chemical composition: 78% CaF_2, 20% Al_2O_3, with the remainder mixtures of SiO_2, FeO, MnO, etc. Vacuum-arc remelting of the steel was carried out in a type TsEP-359 vacuum-arc furnace with a crystallization agent having a diameter of 280 or 380 mm. The working vacuum was 10^{-3} mm Hg. The chemical make-up of the ShKhl5 steel remained practically unchanged during the remelting. The non-metallic inclusions were analyzed by metallographic and chemical methods. Corundum, magnesia spinel, silicate globules and titanium nitride were the principal inclusions encountered in the steel. Remelting leads to their reduction, but not to their disappearance. The main inclusions, depending on the type of remelting used, are specified in the article. For the purposes of chemical analysis, the residue of the non-metallic inclusions was electrolytically separated as a deposit in Fitterer electrolyte. The amount of these inclusions was found to decrease with remelting; vacuum-arc remelting was found to be particularly effective in the removal of aluminum oxide, and the electroslag method - in the elimination of silicates. A comparison was also made of the results of the chemical analysis of the non-metallic inclusions with an analysis of the gases in the steel. These results are presented in tabular form. The overall content of gases was seen to fall off with remelting. The oxygen in the steel was found to be in a bound state in the form of oxides. The authors call attention to the fact

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L 19742-65
ACCESSION NR: AT4048341

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that all three methods (metallographic, chemical and gas analyses) used in the investigation of the non-metallic inclusions and gases yielded which were in substantial agreement. The gases and inclusions disrupt the crystal structure, causing the generation of various stresses and leading to a shortened lifetime for the part. A comparison was made of the mechanical strength (its relative value with respect to the base melt) of bearing steel. The results of this examination are also presented in tabular compilation and shown in the form of a figure. The smaller the quantity of non-metallic inclusions, the longer the service life of the bearing. The relation between the quantity of non-metallic inclusions and the relative service life of the bearing can be analytically expressed as follows: $y = AX^w$, where $A = 0.55$; $w = 1.06$; X is the percentage of non-metallic inclusions in the metal; and y is the relative service life of the bearing in %. Orig. art. has: 1 figure and 3 tables.

ASSOCIATION: none

SUBMITTED: 20May64 ENCL: 00 SUB CODE: MM

NO REF SOV: 000 OTHER: 000

Card 3/3

KLYACHKO, Yu.A., prof.; GORLOVA, O.M.

Present-day state of the anlysis of gases in metals. Zhur. VKHO 9 no. 2:205-214 '64. (MIRA 17:9)

KLYACHKO, Yu.A., prof.

Bibliography. Zhur.VKHO 9 no. 3:347 '64. (MIRA 17:9)

MAL'TSEVA, V.S.; KLYACHKO, Yu.A.

Inversion of a series of anions during anodic polarization of alloys. Zhur. VKHO 9 no. 3:348 '64. (MIRA 17:9)

1. TSentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii.

KLYACHKO, Yu.A.; MAL'TSEVA, V.S.

Effect of mixtures of anions on the anodic polarization of a metal. Zhur. VKHO 9 no. 3:355-356 '64. (MIRA 17:9)

1. Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii.

KLYACHKO, Yu.A.; LARINA, O.D.

Method of separation of carbides in the analysis of inclusions in steel. Zav. lab. 30 no.8:930-933 '64. (MIRA 18:3)

1. TSentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii imeni Bardina.

L 52081-65 EWT(m)/EPF(c)/EWA(d)/EPF(n)-2/EPR/EWP(t)/EWP(z)/EWP(b) LJP(c)
MJW/JD/WW/JG

ACCESSION NR: AT5012937 UR/2776/64/000/037/0150/0154

AUTHOR: Klyachko, Yu. A.; Shapiro, M. M.

TITLE: Differential analysis of nitrides

SOURCE: Moscow. Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii. Sbornik trudov, no. 37, 1964. Novyye metody ispytaniy metallov; khimicheskiy kontrol' v metallurgii (New methods in the analysis of metals; chemical control in metallurgy), 150-154

TOPIC TAGS: nitride determination, steel analysis, Kjeldahl method, steel electrolysis, Beeghly halogenation, alloy steel

ABSTRACT: To analyze nitrides in steel, the authors used a modification of the Kjeldahl method: the nitrides were converted into ammonium salts, and nitrogen was driven off in the form of ammonia, which was titrated with 0.01 N H_2SO_4. The nitrides were isolated from steel by the three known methods: electrolysis in an aqueous solution, Beeghly halogenation, and electrolysis in a nonaqueous electrolyte (1150 ml methanol and 50 ml HCl). Steel 18G2AF containing 0.02% Al and 0.055% V or 0.02% Al and 0.07% V was used. It was found that the most complete separation of the nitrides (AlN + VN) from vanadium steel is achieved by electrolytic dissolution of the sample

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L 52081-65

ACCESSION NR: AP5012937

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in an aqueous chloride solution (15% NaCl). Nitrides were also determined in alloy Kh20N80, containing 0.04-0.08% Al, 0.12-0.36% Ti, and 0.00-0.49% Zr. AlN was determined by dissolving the sample in the nonaqueous electrolyte, and TiN and ZrN were analyzed by electrolysis in the aqueous chloride electrolyte. Orig. art. has: 3 tables and 1 formula.

ASSOCIATION: Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii, Moscow (Central Scientific Research Institute for Ferrous Metallurgy)

SUBMITTED: 00 ENCL: 00 SUB CODE: MM, IC

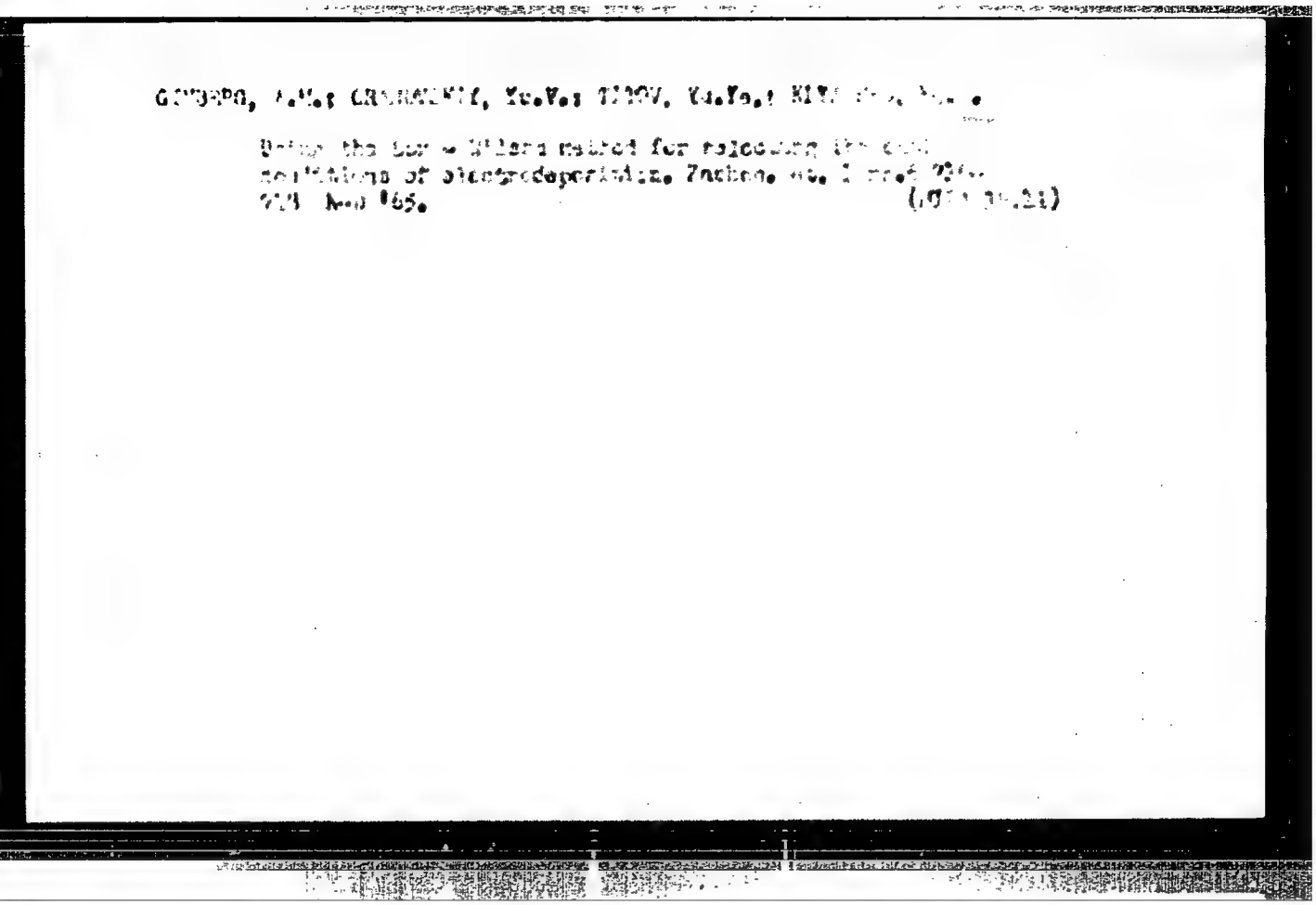
NO REF SOV: 007 OTHER: 002

Card 2/2

KLYACHKO, Yu.A.; BARANOVA, O.K.

Electrochemical phase analysis of high-carbon steels. Zav. lab. 30 no.11:1318-1321 '64 (MIRA 18:1)

1. Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii im. I.P. Bardina.



KLYACHKO, Yu.A., prof.

20th International Congress of Theoretical and Applied Chemistry. Zhur. VKHO 10 no. 6:692-693 '65 (MIRA 19:1)

KLYACHKO-GURVICH, A.L.

Measuring the specific surface of powders by the adsorption of krypton. Sbor.nauch.trud.GIPTSVETMET no.16:63-70 '59. (MIRA 14:4)

(Gases—Adsorption) (Surface measurement)

RUBINSHTEYN, A.M.; KLYACHKO-GURVICH, A.L.; AKIMOV, V.M.

Phase composition and texture of alumina-chromium oxide catalysts prepared by coprecipitation. Izv.AN SSSR.Otd.khim.nauk no.5:780-788 My '61. (MIRA 14:5)

1. Institut organicheskoy khimii im. N.D.Zelinskogo AN SSSR.
(Alumina) (Chromium oxide)

YAKERSON, V.I.; FEDOROVSKAYA, E.A.; KLYACHKO-GURVICH, A.L.; RUBINSHTEYN, A.M.

Vapor phase catalytic ketonization of CH_3COOH over oxides of tetravalent metals and BeO. Izv. AN SSSR. Otd.khim.nauk no.8:1527-1528 Ag '61. (MIRA 14:8)

1. Institut organicheskoy khimii im. N.D. Zelinskogo AN SSSR.
(Acetic acid) (Ketones) (Catalysts)

RUBINSHTEYN, A.M.; PRIBYTKOVA, N.A.; AKIMOV, V.M.; KRETALOVA, L.D.; KLYACHKO-GURVICH, A.L.

Effect of alkali metal oxides on the activity, selectivity, and phase composition of binary catalysts based on Al_2O_3. Izv. AN SSSR. Otd.khim.nauk no.9:1552-1558 S '61. (MIRA 14:9)

1. Institut organicheskoy khimii im. N.D.Zelinskogo AN SSSR.
(Alkali metal oxides) (Catalysts)

KLYACHKO-GURVICH, A.L.

Simplified method for determining the surface area by air adsorption. Izv.AN SSSR.Otd.khim.nauk no.10:1884-1886 O '61. (MIRA 14:10)

1. Institut organicheskoy khimii im. N.D.Zelinskogo AN SSSR.
(Surface measurement) (Adsorption)

RUBINSHTEYN, A.M.; KLYACHKO-GURVICH, A.L.

Simple and rapid methods for determining the surface area of catalysts. Kin.i kat. 3 no.4:599-601 Jl-Ag '62. (MIRA 15:8)

1. Institut organicheskoy khimii imeni N.D.Zelinskogo AN SSSR.
(Catalysts)

YOSHT, F. [Jost, F.]; KLYACHKO-GURVICH, A.L.; RUBINSHTEYN, A.M.

Texture of Ni-Al_2O_3 catalysts for a simultaneous hydrogenation and dealkylation of cresols. Izv. AN SSSR. Ser. khim. no.12:2105-2110 D '63. (MIRA 17:1)

1. Institut organicheskoy khimii im. N.D. Zelinskogo AN SSSR i Institut teoreticheskikh osnov khimicheskikh protsessov Akademii nauk Chekhoslovatskoy Sotsialisticheskoy Respubliki, Praga.

AKIMOV, V.M.; KLYACHKO-GURVICH, A.L.; RUBINSHTEYN, A.M.; SIMULIN, Yu.N.; SLINKIN, A.A.; SEMINA, R.T.

Study of catalysts for ammonia synthesis with different degrees of reduction. Izv. AN SSSR. Ser. khim. no.12:2208-2210 D '63. (MIRA 17:1)

1. Institut organicheskoy khimii im. N.D. Zelinskogo AN SSSR.

SIMULIN, Yu.N.; LACHINOV, S.S.; TOROCHESHNIKOV, N.S.; BARDIK, Z.N.; KLYACHKO-GURVICH, A.L.

Change in the specific activity of an iron catalyst for ammonia synthesis as dependent on the degree of reduction. Kin. i kat. 4 no.6:933 N-D '63. (MIRA 17:1)

1. Gosudarstvennyy institut azotnoy promyshlennosti.

LACHINOV, S.S.; RUBINSHTEYN, A.M.; AKIMOV, V.M.; KLYACHKO-GURVICH, A.L.; KONYUKHOVA, I.N.; KUZNETSOV, L.D.; LEVITSKAYA, T.T.; PRIBYTKOVA, N.A.; SLINKIN, A.A.; CHESNOKOVA, R.V.

Complex investigation of iron catalysts for ammonia synthesis. Kin. i kat. 5 no.3:478-489 My-Je '64. (MIRA 17:11)

1. Institut organicheskoy khimii AN SSSR i Gosudarstvennyy institut azotnoy promyshlennosti.

L 52349-65 EPF(c)/EWP(j)/EWT(m) Po-4/Pr-4 RM

ACCESSION NR: AP5011683 UR/0195/65/006/002/0285/0293

AUTHOR: Rubinshteyn, A. M.; Pribytkova, N. A.; Akimov, V. M.; Klyachko-Gurvich, A. L.; Slinkin, A. A.; Mel'nikova, I. V.

TITLE: A comprehensive study of ferric catalysts for ammonia synthesis
II. Structure and grain of twice activated precipitated catalysts

SOURCE: Kinetika i kataliz, v. 6, no. 2, 1965, 285-293

TOPIC TAGS: ammonia, potassium compound, alumina, catalyst

ABSTRACT: The authors studied the effect of potassium oxide on the following properties of iron-alumina catalysts synthesized from coprecipitated hydroxides: specific surface, specific volumes and mean radii of pores (note: these three parameters define the term "grain" as used in this article), phase composition, magnetic susceptibility, saturation magnetization, and ferromagnetic resonance spectra. The addition of K_2O doubles the activity in comparison to catalysts activated only by Al_2O_3. The potassium oxide does not change the optimum quantity of Al_2O_3. The activity of a unit volume of the precipitated catalysts is close to that of fused catalysts of the same composition. The test specimens were made up with 8 different Fe_2O_3/Al_2O_3 ratios (see table 1 of the Enclosure). The samples were prepared in 4

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series: the first was the "control" series activated only by Al_2O_3; the other 3 series were activated by K_2O at various stages of synthesis. It was found that the later the stage at which the potassium oxide activation takes place, the less the grain of the catalyst is changed. X ray analysis indicated that the addition of an alkali has a strong stabilizing effect on the lattice of the maghemite phase, especially if the alkali is introduced at the hydroxide stage. This stabilizing effect on spinel structures depends on the state of the initial iron compounds. "Research conducted jointly with GIAP Laboratory Nr 3." Orig. art. has: 4 tables.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo AN SSSR (Institute of Organic Chemistry)

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ENCLOSURE: 01

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Table 1

Sample No	1	2	3	4	5	6	7	8
Fe_2O_3 Wt. %	62.5	86.6	92.1	94.6	94.7	97.6	98.85	99.35
Al_2O_3 Wt. %	37.5	13.4	7.9	5.4	5.3	2.4	1.15	0.65

Card 3/3 mB

KAGAN, L.Kh.; KLYACHKO-GURVICH, A.L.; RAPOPORT, I.B.; RUBINSHTEYN, A.M.

Effect of the conditions of the reduction of iron-copper catalysts on their physicochemical properties. Khim. i tekh. topl. i masel 10 no.3:14-16 Mr '65. (MIRA 18:11)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut po pererabotke nefti i gazov i polucheniyu iskusstvennogo zhidkogo topliva.

YAKERSON, V.I.; LAFER, L.I.; KLYACHKO-GURVICH, A.L.; RUBINSHTEYN, A.M.

Catalytic ketonization of acetic acid over mixed catalysts $ZrO_2 - Al_2O_3$. Izv.AN SSSR. Ser.khim. no.1:83-89 '64. (MIRA 19:1)

1. Institut organicheskoy khimii im. N.D.Zelinskogo AN SSSR. Submitted August 23, 1963.

Klyachko-Gurvich, B.L.

KLYACHKO-GURVICH, B.L.

[redacted] growing of collective farms engaged in reclamation of new lands.
Zemledelie 6 no.1:59-62 Ja '58. (MIRA 11:1)
(Soviet Far East--Collective farms)